SECTION 79

LADDERS, GRATINGS, FLOORPLATES, PLATFORMS & WALKWAYS IN MACHINERY AND MISCELLANEOUS SPACES

79.1 REFERENCES

(Not Used)

79.2 INTRODUCTION

This Section contains Contractor Design and Provide general requirements for ladders, gratings, floorplates and handrails that are necessary in machinery and miscellaneous spaces throughout the Vessel.

For WSF Fleet-wide Standardization purposes, End No. 1 of the Vessel shall always be considered the bow, and this designation shall delineate port and starboard, fore and aft wherever they are addressed in the Technical Specification.

79.3 GENERAL

Ladders, walkways, floors and platforms shall be provided, as necessary, for convenient access to and operation of all machinery, apparatus and controls, and for entrance to and escape from the machinery spaces. Ladders, walkways, floors, platforms and handrails shall be of portable construction and easily removable to the extent required for access to and removal of piping, machinery and other components, with the remaining sections self-

supporting. The walking or working surface shall be composed of fixed or portable solid floor plating or portable open gratings as appropriate. Raised or depressed portions of operating platforms, floorplates, gratings and walkways shall be avoided to the maximum extent practical, but if they are necessary they shall be provided with steps and be adequately protected with guard rails.

Where stainless steel bolting is used, the threads of all bolts shall be coated with an appropriate anti-seize compound prior to assembly.

Ladders, walkways and elevated platforms shall be provided with adequate stanchions, handrails, toe plates and fastenings. Stanchions and guard rails shall be provided around all openings in the main operating platforms or floors at all levels and around machinery and elsewhere as required for safety in operation.

Toe plates approximately two (2) inches high shall be provided in way of all openings and boundaries of floorplates and gratings. Suitable tight coamings shall be provided around machinery subject to oil or water leakage, and around permanent openings.

Walkways, floors and platforms shall be designed to support static loads of 200 pounds per square foot (psf) and shall be locally reinforced where greater loadings are contemplated in the removal or disassembly of machinery for overhaul. Ladder treads shall be designed to support a load of 300 pounds. Floor plates and gratings shall be provided as specified below in **TABLE 79-1**, *Grating & Floorplate Schedule*.

Walkways shall be of dimensions as required by Section 50 of the Technical Specification.

Painting shall be in accordance with this Section and Section 14 of the Technical Specification.

79.4 LADDERS IN MACHINERY SPACES

NOTE: Only ladders in machinery spaces and uptake casings are discussed in this Section of the Technical Specification. All other ladders or stairways are specified in Section 5 of the Technical Specification. Unless otherwise specified, fabrication and installation details are covered under Section 5 of the Technical Specification.

Ladders shall lead fore and aft whenever possible. Treads shall be of closed non-slip type and designed and constructed to avoid being bent during the moving of equipment. Treads for ladders between the Lower Vehicle Deck and the Engine Room Upper Levels shall have a minimum width of twenty-eight (28) inches. Treads for ladders between the machinery flats areas shall be a minimum width of thirty-six (36) inches All ladders shall be of steel construction and removable without the use of tools.

NOTE: As set forth in the *MACHINERY SPACE NOMENCLATURE AND ARRANGEMENT* Subsection of Section 50 of the Technical Specification, the Engine Rooms

upper level, Engineer's Stores, Workshop, Engineer's Dayroom, Engineer's Restroom, Chief Engineer's Office, and EOS shall be on the same level.

Solid type safety treads, FIBERGRATE COMPOSITE STRUCTURES Inc. Fiberplate® Fiberglass Stair Tread Covers with photo luminescent nosing area, or equal, shall be provided over the treads as specified in this Section and Sections 5 and 6 of the Technical Specification. Treads shall be attached using Type 316 stainless steel fasteners with Nyloc type nuts.

Removable sheet metal dust shields shall be fitted below inclined ladders in the Engine Rooms, Reduction Gear Rooms, Engineers Stores, and Work Shop. Dust shield bolting shall be Type 316 stainless steel.

Ladders in trunks providing access to machinery spaces shall be installed in such a manner that their removal is not necessary when moving equipment and supplies through the trunk.

Inclined access ladders from the lower machinery space deck plate level, down to the shell plate areas shall be provided with open grating treads of a GS METAL Corp., HD Grip Strut, or equal, safety tread type. Fiberplate® Fiberglass Stair Tread Covers shall not be installed on these ladder treads.

Vertical ladders shall be used only where conditions do not permit use of inclined ladders. Vertical ladders shall be in accordance with ASTM F840, **Figure 1** ~ *Vertical Ladder Type I* with a minimum of six (6) inches free toe clearance. The first and last ladder rungs shall be twelve (12) inches (±2 inches) from the deck or landing (ladder top and bottom) served by the ladder. Hand grabs shall be provided above the top of all vertical ladders.

79.5 FLOORPLATES

Unless otherwise specified, machinery space portable floor plates shall be ¼ inch thick 6061 Series aluminum diamond tread safety plate for machinery space walkways, platforms, and floors generally as outlined in **TABLE 79-1**. All floor plates shall be secured with flush stainless steel, countersunk, square-drive, machine screws of at least $^{5}/_{16}$ inch diameter. Floor plate sections shall be no larger than can be conveniently handled by one (1) man.

Whenever possible, use a standard spacing for the floorplate support grid.

Coaming and supports, in way of machinery requiring periodic removal shall be of steel angle, weld construction sections attached to permanent supports with stainless steel bolt fasteners.

Supports shall be 2 inch × 2 inch × ¼ inch angle spaced so that unsupported plate panels do not exceed eight (8) square feet and the shorter span does not exceed twenty-four (24) inches. Supports shall not extend above the surface of abutting plates.

Fasteners for portable plates to coamings shall be counter-sunk, square-drive stainless steel machine screws.

Landings on either side of fire screen doors and landings at the head and base of ladders/stairways shall be provided with ¼ inch thick Type 304 stainless steel safety tread plates and steel support members. Final location of the steel deck plates shall be approved by the WSF Representative prior to construction.

Provide tee-handle, square head wrenches and holder brackets for floorplate removal. Tee-handle wrenches shall be provided in such quantity and dispersal so as to allow access to a tee-handle wrench within twenty (20) feet on any level of the space. Engine Rooms shall have a minimum of four (4) tee-handle wrenches per deck plate/grating level.

Hinged portable plates shall be provided in the way of areas under the floor plate level requiring periodic observation or inspection, and for access to rose boxes, valves, strainers, manifolds high speed shaft bearings, and other equipment located below the floor plate level. Flush type hand grabs shall be provided for lifting the hinged plates, and hinges shall not extend above the plate surface.

Where pipes pass through flats with a working space below, the openings shall be surrounded by a coaming about three (3) inches high to prevent drainage of spilled liquids into the space below. Other openings in and free edges of such plates shall be similarly protected. Drains for removal of casual drainage and spilled liquids shall be provided as necessary.

79.6 GRATINGS

Open galvanized steel grating shall be used for Navigation Bridge Deck catwalks, stack uptake space walkways, platforms and floors generally as outlined in **TABLE 79-1**.

In selecting open grating areas for ventilation purposes, due regard shall be paid to the probable path of the return mass air flow and its effect on the ambient conditions surrounding important items of machinery. In addition, such grating areas shall be located away from main traffic paths and operating stations insofar as practicable.

Open gratings shall be steel with a slip-resistant safety tread pattern approved by the WSF Representative. The standard grating panel shall be approximately 2 feet × 6 feet, but panels of other sizes may be used where necessary within equivalent limits of easily portable size and weight. Where special shapes or cutouts are necessary, the edges shall be finished with a bonding bar for rigidity and to eliminate protruding members. Supports for abutting sections shall not extend above the grating surface. Stainless steel fastenings and clips shall be provided for firmly holding the gratings to the supporting structure. Fasteners and clips shall not protrude above the grating level.

Decks in the Fire Fighting Foam Storage Lockers, Sun Deck Life Jacket Lockers, Deck Gear Lockers and Tow Bridle Storage Space on the Upper and Lower Vehicle Decks shall be properly prepared and coated in accordance with Section 14 of the Technical Specification. After the paint coating system, the spaces shall have a fiberglass grating system installed directly onto the entire painted deck area. The grating system shall be GRATING PACIFIC,

LLC., ViCORR Molded Fiberglass Grating or equal, two (2) inch deep square mesh, color "ORANGE". The Contractor shall size all grating sections to the largest size practicable, while still allowing installation and removal through the space access door.

TABLE 79-1

Grating & Floor Plate Schedule

SPACE	LEVEL (If applicable)	TYPE OF DECKING
Steering Gear Rooms	---	Floor Plate
Engine Rooms and Shaft Alley	Upper Level Lower Level	Floor Plate Floor Plate
Reduction Gear Rooms	Upper Level Lower Level	Floor Plate Floor Plate
Tank Rooms	All Levels	Floor Plate
Voids No. 1 & No. 2	Lower Level	Floor Plate
Stack Uptake	All Levels	Steel Grating
Emergency Diesel Generator Room exhaust stack uptake	Navigation Bridge Deck	Steel Grating
Tow Bridle Storage	Lower Vehicle Deck	Fiberglass Grating
Fire Fighting Foam Storage/Gear Lockers (2)	Lower Vehicle Deck	Fiberglass Grating
Fueling Equipment Locker	Lower Vehicle Deck	Fiberglass Grating
Deck Lockers (all)	Upper Vehicle Deck	Fiberglass Grating
Life Jacket Lockers (2)	Sun Deck	Fiberglass Grating
Deck Lockers (all)	Sun Deck	Fiberglass Grating
End No. 1 and No. 2 Access Catwalks	Navigation Bridge Weather Deck	Steel Grating

79.7 HANDRAILS AND STANCHIONS

Except in way of electrical equipment, such as switchboards where non-conducting material must be used, handrails and stanchions shall be at least 1¼ inch IPS Schedule 40 galvanized steel pipe. Handrails supported from bulkheads or other surfaces shall have a clear hand space of at least 2½ inches. All welds shall be ground smooth.

Handrails shall be made portable to facilitate removal of machinery as necessary. See Section 5 of the Technical Specification for additional information.

Single course handrails on both sides of inclined ladders shall be provided. The top rail of these handrails are to be left unpainted, the vertical supports are to be painted.

Handrails for inclined ladders shall extend at least one (1) foot beyond the nosing of the last tread. Such rails shall have a smooth finish.

Whenever possible, use a standard spacing for the floorplate support grid. Design and provide appropriate diameter temporary handrail stanchion sockets at each corner of the grid for each floor plate, such that a temporary handrail stanchion can be dropped into the opening perimeter sockets to safely enclose the opening whenever a floor plate must be removed to gain access below. For each Engine Room, provide eight (8) top capped, one (1) inch IPS Schedule 40 galvanized steel pipe temporary handrail stanchions, with five (5) LF of galvanized "proof coil" chain attached by a staple approximately two (2) inches down from the top cap on each temporary handrail stanchion. Provide one (1) galvanized shackle, which fits the chain, with each temporary handrail stanchion. The temporary sockets shall be designed and provided flush with the grid surface so that they do not show unless the floor plate is removed. The galvanized temporary handrail stanchions **shall not** be painted. The Contractor shall provide a proposed layout of the stanchion sockets to WSF for approval prior to installation.

79.8 SPARE PARTS AND INSTRUCTION MANUALS

Provide a list of recommended spare parts and special tools for those items which are Contractor furnished, together with parts lists and instruction manuals necessary to maintain and service provided equipment and accessories in accordance with the requirements of Sections 86 and 100 of the Technical Specification.

79.9 TESTS, TRIALS AND INSPECTIONS

Tests and/or Trials shall be in accordance with this Section and Section 101 of the Technical Specification.

Inspections shall be performed as defined in this Section and in Sections 1 and 2 of the Technical Specification.

79.10 PHASE II TECHNICAL PROPOSAL REQUIREMENTS

The drawings required by Section 100 of the Technical Specification and the Authoritative Agencies, shall be provided during the Phase II Technical Proposal stage of Work in accordance with the requirements of Section 100 of the Technical Specification.

79.11 PHASE III DETAIL DESIGN AND CONSTRUCTION REQUIREMENTS

The deliverables required by Section 100 of the Technical Specification and the Authoritative Agencies, shall be provided during the Phase III Detail Design stage of Work in accordance with the requirements of Section 100 of the Technical Specification.

(END OF SECTION)